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W W Hall (f)
A
Lincoln's Inn
Brief Description

OF THE
SOLAR SYSTEM.

To which is Subjoined,

An Astronomical ACCOUNT
Of the YEAR of
OUR SAVIOUR'S
CRUCIFIXION.

By JAMES FERGUSON.

*The Works of the LORD are great, sought out of
all them that have Pleasure therein. Pf. cxi. 2.*

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A

BRIEF DESCRIPTION
OF THE
SOLAR SYSTEM.

THE SUN! that immense and amazing
Globe of Fire, whose Circumference
is 2,398,000 Miles, is placed in the
Centre of our System, and turns round
like a Wheel on its Axis in 25 Days and 6
Hours. This glorious Luminary has six opaque
Globes or Planets belonging to it, called Mercury,
Venus, the Earth, Mars, Jupiter, and Saturn.

MERCURY, the nearest Planet to the Sun,

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goes round him in 87 Days 23 Hours; travelling at the rate of 100,000 Miles every Hour. Its Distance from the Sun is 32,000,000 of Miles, and its Circumference 13,350. Its Light and Heat is seven times as great as ours.

VENUS, the next Planet in order, is 59,000,000 of Miles distant from the Sun, and goes round him in 225 Days 17 Hours; moving at the rate of 70,000 Miles every Hour; her Circumference is 24,823 Miles, and she turns round her Axis in 24 Days 8 Hours, according to *Bianchini*. Her Light and Heat is almost twice as great as ours.

THE EARTH, betwixt the Orbits of Venus and Mars, is 81,000,000 of Miles distant from the Sun, and goes round him in a Year; moving 58,058 Miles every Hour, which is 120 times swifter than the Motion of a Cannon Bullet. Its Circumference is 25,020 Miles, and it turns round its Axis in 24 Hours. The Moon's Circumference is 6836 Miles, her Distance from the Earth 240,000; and the time of her going round the Earth from Change to Change is 29 Days, 12 Hours, 44 Minutes, 3 Seconds; in which time she has just one Day and one Night.

MARS is the next Planet to the Earth; it goes round the Sun in 1 Year 322 Days 17 Hours, at the rate of 45,000 Miles every Hour. Its Distance from the Sun is 123,000,000 of Miles; its Circumference 13,967; it turns round its Axis in 24 Hours 40 Minutes. Its Light and Heat is not quite half so great as ours.

JUPITER

JUPITER, the biggest of all the Planets, is still higher in the System; being 424,000,000 of Miles from the Sun: It performs its annual Course round the Sun in 11 Years 313 Days 15 Hours, advancing forward 24,000 Miles every Hour: Its Circumference is 254,469 Miles; it turns round its Axis in 9 Hours 56 Minutes. Its Light and Heat is but $\frac{1}{28}$ Part of ours, but this small Quantity is compensated in a great Measure by its quick Returns; and by four friendly Moons which in various times revolve round this huge Planet, there is scarce ever any Part of it but what is enlightened by one or more of them. The first, or nearest Moon to Jupiter revolves round him in 1 Day 18 h. 28 m. the second in 3 Days 13 h. 15 m. the third in 7 Days 3 h. 59 m. and the fourth in 16 Days 18 h. 30 m. This Planet seen from its nearest Moon would appear 1387 times as large as our Moon does to us.

SATURN, the remotest of all the Planets from the Sun, is distant from him 777,000,000 of Miles; and by travelling 18,000 Miles in his Orbit every Hour, goes round the Sun in 29 Years 167 Days 10 Hours. His Circumference is 191,637 Miles, and he is surrounded by a vast, but thin Ring encompassing his Body as an Horizon does a Globe, no where touching it. The Light and Heat communicated to this Planet by the Sun, is but $\frac{1}{60}$ Part so great as to our Earth; but he has five Moons going round him for the same Purpose that Jupiter has four. The

time of his Rotation on his Axis, as well as that of Mercury's, is unknown.

THE Circumferences and Distances of the Planets are expressed in English Miles: And if a Body was projected from the Sun so as to fly with the Swiftnefs of a Cannon Ball, *i. e.* 480 Miles every Hour, it would reach the Orbit of Mercury in 7 Years 221 Days; of Venus in 14 Years 8 Days; of the Earth in 19 Years 91 Days 12 Hours; of Mars in 29 Years 80 Days 16 Hours; of Jupiter in 100 Years 280 Days 13 Hours; of Saturn in 184 Years 240 Days 6 Hours; and to the nearest fixt Stars not in less than 700,000 Years.

THE Planets are retain'd in their Orbits by the duly ballancing of their projectile Forces to that of the Sun's Attraction upon them: For, if the projectile Force of each Planet should be stopt, and the Sun's Attraction upon it continue, Mercury would fall to the Sun in 15 Days 18 Hours; Venus in 39 Days 17 Hours; the Earth in 64 Days 10 Hours; Mars in 121 Days; Jupiter in 390 Days, and Saturn in 767. If the Moon's projectile Force was stopt, she would fall to the Earth in 4 Days and 21 Hours.

LIGHT is known to come from the Sun to the Earth in 7 Minutes and an half; consequently it flies at the rate of 648,000,000 of Miles every Hour; 10,800,000 Miles every Minute; and 180,000 Miles every Second of Time.

It is supposed there are 21 Comets belonging to our System, of which, only the Periods of three are known. The first of them appeared in 1531, 1607, and 1682; and is expected to appear again in 1758, and every 75 Years afterwards. The second of them in 1532 and 1661; and so may be expected to return in 1789, and every 129 Years afterwards. The third, having last appeared in 1680, and its Period being no less than 575 Years, cannot return until A. D. 2255. To this Comet, the Sun when nearest, appeared 57,600 times as large as the Sun does to us.

To give a natural and pleasing Idea of the proportional Bulks and Distances of the Sun and Planets, I shall take the Liberty to quote the following Paragraph from *Wright's* Synopsis of the Universe.

“ THE Diameter of the Dome of *St. Paul's* is
 “ 145 Feet; suppose this to represent the Sun;
 “ then will a Globe $7\frac{2}{10}$ Inches represent Mercu-
 “ ry; one of $17\frac{2}{10}$ Inches, Venus; one of 18
 “ Inches the Earth; one of 5 Inches the Moon;
 “ one of 10 Inches Mars; one of $15\frac{1}{3}$ Feet Ju-
 “ piter; and one of $11\frac{1}{2}$ Feet Saturn, with his
 “ Ring 4 Feet broad, and every where as far from
 “ his Body. In this Proportion, suppose the Sun
 “ to be at *St. Paul's*, Mercury might be at the
 “ Tower, Venus at *St. James's* Palace, the Earth
 “ at *Mary-le-bone*, Mars at *Kenfington*, Jupiter at
 “ Hampton-

“ *Hampton-Court*, and Saturn at *Cleifden*; all moving round the Cupola of *St. Paul’s* as their common Centre. The Aphelion of the first Comet would be about *Bury*, the second at *Bristol*, and the third at *Edinburgh*. But, to take into our Idea one of the nearest Stars, instead of the Dome of *St. Paul’s*, we must suppose the Sun to be represented by the gilt Ball on the Top of it; and then such another on the Top of *St. Peter’s* at *Rome* will represent the Star.”

THE Times in which the Planets move round the Sun in their Orbits are the Lengths of their Years; and the Times of their turning round their Axes are the Lengths of the Days and Nights taken together, in each Planet respectively.

HENCE, in Mercury, a Year is equal in Length to 87 Days 23 Hours with us; in Venus it is equal to 224 Days 17 Hours; on our Earth to 365 Days 5 Hours 49 Minutes; in Mars to one Year 322 Days 17 Hours; in Jupiter to 11 Years 313 Days 15 Hours; and in Saturn to 29 Years 167 Days 10 Hours.

IN Venus a Day and a Night is as long as $24\frac{1}{3}$ Days and Nights with us; in Mars it is but 40 Minutes longer than ours; and in Jupiter it is only equal to 9 Hours 56 Minutes of our terrestrial Time.

THE

of her dark, and half of her light Side is towards the Earth, and then she appears just half Full, increasfing or decreasfing.

T W E L V E mean Lunations, or Courses of the Moon round the Earth from Change to Change, contain 354 Days 8 Hours 48 Minutes 37 Seconds and 48 Thirds; consequently, twelve Lunar Months want almost 11 Days of a Solar Year: And 19 Julian Years contain just 235 mean Lunations, and 1 Hour 27 Minutes 40 Seconds over: But 19 Tropical Years fall 2 Hours and 2 Minutes short of 235 Lunations.

S O M E T I M E S, the Moon at her Change comes so directly betwixt the Sun and Earth, as to hide or eclipse the Sun from our Eyes; and sometimes she is so directly opposite to the Sun when at her Full, as to go into the dark Shadow of the Earth, and be eclipsed her self. These Eclipses would happen at every New and Full Moon, if the Moon's Orbit lay in the same Plane with the Earth's: But as one half of the Moon's Orbit is above, and the other half below the Earth's, crossing it in two opposite Points called the Nodes, 'tis plain there can be no Eclipses but when the New or Full Moon happens in or near about these Nodes. They move backward thro' all the Parts of the Earth's Orbit in 18 Years and 224 Days.

I N 18 Years 11 Days 7 Hours and 43 Minutes, the Sun, Moon and Nodes always come together

(II)

together, or in a Line of Conjunction; Therefore, if to the mean time of any Eclipse of the Sun or Moon in a Leap Year, you add 18 Years 11 Days 7 Hours and 43 Minutes, you will have the mean time of that Eclipse returned again: But in reckoning from any Eclipse in a common Year, you must add 18 Years 10 Days 7 Hours 43 Minutes to have the return of that Eclipse.

THE Moon in a total Eclipse would be quite invisible, were it not for the Rays of the Sun's Light being so refracted by the Earth's Atmosphere as to enter into its Shadow, and cast that faint reddish Light upon the Moon which makes her visible even in the greatest Eclipse she can suffer.



An



*An Astronomical Account of the Year
of our SAVIOUR'S CRUCIFICTION.*

IN the fifth Lecture of my Courses of Astronomy, I used to shew that there could not be a natural or regular Eclipse of the Sun on the Day that our Saviour was crucified; which, by the Vulgar Account, was on the third of April in the 33^d Year of his Age: On which Day, my Orrery shews that the Moon was Full, and consequently could not then eclipse the Sun. But, being sometimes asked how I could be certain as to the Year, my usual Answer was, That supposing we be wrong as to the Year, yet we are told in Scripture that the Crucifixion was on the Day the Passover was eaten, and that the Passover was always kept on the fourteenth Day of the Month; which according to the Reckoning of the Jews, was the Day of Full Moon. *St. John ch. 18. v. 28. Exod. ch. 12. v. 6.*

THIS made me consider if there might not be some Method found to ascertain the true Year; and from the following Reflections an Argument soon occurred, which I hope will appear to deserve some Regard.

T H E

THE Jews reckoned the Moon's Age from the first Day of her Appearance ; and on account of the pureness of their Air they generally saw the Moon when she was but one Day old : And so, by their Reckoning, the fourteenth Day of the Moon answers to our fifteenth, on which Day she is at the Full. But if at any time they missed seeing her on the first or second Day of her Age, they could easily judge by her Phases upon seeing her afterwards, how old she was, and so reckon accordingly.

THEIR Custom was to keep the Passover at the time of the Full Moon next after the Vernal Equinox ; which, in Our Saviour's Time, fell upon the 22d Day of March.

By comparing *St. Matthew ch. 26. v. 20.* with *St. John ch. 18. v. 28.* it would appear to us, that our Saviour eat his last Supper on the Day before the Passover was kept by the Jews : But by their Reckoning, it was all on the same Day ; for they began their Day in the Evening, and eat the Passover any time betwixt the two Evenings.

THEY measured their Months by the Moon, and their Years by the Revolution of the Sun, which obliged them to intercalate eleven Days at the end of every Year ; for twelve Lunar Months want almost eleven Days of twelve Months as measured by the Sun.

